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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

September 21, 1999

BY HAND DELIVERY
Ms. Magalie Salas
Secretary
Federal Communications Commission
445 12th Street SW, Room TW-B204
Washington DC 20554

Re: ET Docket No. 99-261, Amendment of Part 2 of the Commission's Rules to Allocate Additional Spectrum to Inter-Satellite, Fixed, and Mobile Services and to Permit Unlicensed Devices to Use Certain Segments in the 50.2-50.4 GHz and 51.4-71.0 GHz Bands

Dear Ms. Salas:

On behalf of Harmonix Corporation, I enclose for filing with the Commission the original and four copies of Comments of Harmonix Corporation in the above-referenced proceeding.

Kindly date-stamp and return the extra copy of this cover letter.

If there are any questions about this filing, please call me at the number above.

Respectfully submitted,

Mitchell Lazarus
Counsel for Harmonix Corporation

ML/dd
Enclosures

cc: Shey Hakasui, Harmonix Corporation
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Before the
Federal Communications Commission
Washington DC 20554

In the Matter of	)	
	)	
Amendment of Part 2 of the Commission's	)	
Rules to Allocate Additional Spectrum to the	)	ET Docket No. 99-261
Inter-Satellite, Fixed, and Mobile Services	)	
and to Permit Unlicensed Devices to Use	)	
Certain Segments in the 50.2-50.4 GHz and	)	
51.4-71.0 GHz Bands	)	

COMMENTS OF HARMONIX CORPORATION

Harmonix Corporation ("Harmonix") files these Comments in the above-captioned proceeding.[1] Harmonix manufactures point-to-point equipment for unlicensed use in the 59-64 GHz band.

These comments concern only the Commission's proposal to allocate 57-59 and 64-66 GHz for unlicensed operation.[2] Harmonix supports that proposal. Harmonix expresses no views on other issues raised in the Notice.

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[1] Amendment of Part 2 of the Commission's Rules to Allocate Additional Spectrum to the Inter-Satellite, Fixed, and Mobile Services and to Permit Unlicensed Devices to Use Certain Segments in the 50.2-50.4 GHz and 51.4-71.0 GHz Bands, ET Docket No. 99-261, Notice of Proposed Rule Making, FCC 99-183 (released July 23, 1999) ("Notice").

[2] Notice at ¶¶ 15-18.

THE COMMISSION SHOULD ALLOCATE 57-59 AND 64-66 GHz FOR UNLICENSED OPERATION, AND SHOULD EXTEND THE CURRENT TECHNICAL RULES AND SPECTRUM ETIQUETTE, WITH MINOR CHANGES.

A. The Commission Should Expand Unlicensed Operation to Include 57-59 and 64-66 GHz.

The Commission's extension of Part 15 authority to increasingly sophisticated devices over the last few decades has been an unqualified success. Where unlicensed operation was originally limited to flea-powered devices like garage door openers and remote control toys, today's Part 15 systems rank among the most advanced short-range telecommunications technologies available. The introduction of spread spectrum technology for civilian use in 1985 fostered the growth of a billion-dollar industry in advanced wireless data communications that now pervades every sector of the economy. Allocation of 59-64 GHz for unlicensed operation opened additional opportunities. Although all Part 15 users share spectrum with other applications, and with each other as well, reports of actual harmful interference in the field are extremely rare.

While Part 15 use has been expanding, users' expectations concerning data speed have grown even faster. Not long ago a T-1 facility at 1.544 Mbps was considered fast for most purposes. Now even ordinary office LANs (and some spread spectrum systems) operate at many times that speed. But point-to-point applications, where the standards are set by multi-gigabit fiber optic facilities, are even more demanding by far.

The convergence of these advances in unlicensed devices and high-speed point-to-point communications has created a demand for unlicensed radio equipment capable of fiber-optic speeds. The existing Part 15 allocation at 59-64 GHz represents a start toward meeting that need,

but its usefulness is limited by atmospheric oxygen's absorption of RF energy at these wavelengths. Oxygen attenuation at 59-64 GHz is 16 dB/kilometer — the equivalent, at visible wavelengths, of a dense fog that limits visibility to about 200 meters. This severely limits the useful range of 59-64 GHz equipment, even at the relatively generous power levels allowed in the band.

The proposed addition of 2 GHz at either side of the existing band would have two main benefits. First, it would roughly double the data speed achievable over short distances. Second, it would make available some bandwidth at the edges of the oxygen absorption band suitable for somewhat greater distances, albeit at reduced data rates — although even there, rain fade will severely limit useful range.

In short, the proposed allocation will directly benefit the public by facilitating fast, inexpensive data communication over short distances, without the delays and inflexibilities that licensing entails. There is no serious risk of harmful interference to the limited existing operations in the bands. The Commission should adopt its proposal.

B. The Commission Should Extend the Existing Technical Rules and Spectrum Etiquette into the New Allocation, but Should Exempt Point-to-Point Systems from the Requirement for Transmitter Identification.

The technical rules and spectrum etiquette at 59-64 GHz are working well, and should be extended almost unchanged into the 57-59 and 64-66 GHz allocation. In particular, the Commission should not impose channelization on those bands.[3] Manufacturers should retain the flexibility to subdivide the band in ways that best meet users' needs, and to vary band divisions in

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[3] *See* Notice at ¶ 18.

response to differing applications. The straitjacket of Commission-imposed channelization may be necessary in some operating environments — for example, to facilitate frequency coordination — but it confers little benefit in the context of unlicensed operation where advance coordination is unnecessary. The spectrum etiquette applicable to the band serves the same fundamental purposes as frequency coordination, without the need for channelization.[4]

The Commission should however, modify the spectrum etiquette in one respect: It should exempt fixed point-to-point transmitters from the transmitter identification requirement in Section 15.255(i).[5] The purpose of this requirement is to "make it possible for a user experiencing interference to identify an interfering fixed source and to resolve interference from such a source . . . ."[6] In practice, however, this provision appears to have been drafted primarily to suit indoor wireless LAN systems using wide-angle antennas. When applied to outdoor point-to-point systems, which are extremely unlikely to cause interference, the requirement adds significant cost without concomitant benefit.

The narrowly focused beam of a point-to-point system yields an inherently low probability of impinging on any given receiver. At a distance where the beam is wide enough that it might present any realistic threat to other equipment, the power has dissipated to

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[4] Frequencies Above 40 GHz for New Radio Applications, 13 FCC Rcd 15074 (1998) (Third Report and Order), *adopting* Report and Recommendations of the Millimeter Wave Communications Working Group (filed Dec. 18, 1996). The spectrum etiquette reserves 59.0-59.05 GHz for future use as a coordination channel. 47 C.F.R. § 15.255(d) (Note).

[5] The spectrum etiquette requires transmitters whose peak output power or peak power density exceeds specified levels to transmit, at least once per second, the transmitter's FCC ID, the manufacturer's serial number, and 24 bytes of field-programmable data with information on how to contact the operator. 47 C.F.R. § 15.255(i).

[6] MWCWG Recommendations at 8-9.

insignificant levels. Even without taking oxygen absorption or rain fade into account, a 60 GHz transmitter operating at the maximum allowable EIRP produces an energy density one kilometer away of only 80 pW/cm².[7] In addition, an outdoor signal must pass through window glass or walls before it can interfere with an indoor system such as a wireless LAN. Typical office-building window glass attenuates another 25-30 dB at these frequencies. Attenuation through walls is even higher. Harmonix Corporation's extensive experience with point-to-point 59-64 GHz radios in Japan confirms what the numbers suggest — that these radios are very unlikely to cause detectable interference to other systems, or to each other.[8]

In addition to being unnecessary for point-to-point systems, the transmitter ID requirement may prove to be unworkable in the field. The spectrum etiquette requires each manufacturer to publish instructions explaining how to detect and decode its transmitter ID signal.[9] Yet an interference victim cannot obtain those instructions without first knowing the identity of the manufacturer — which it cannot determine without detecting and decoding the transmitter ID. That is, the victim must have the instructions to identify the manufacturer, but must identify the manufacturer to obtain the instructions. This is somewhat like storing the combination to a safe inside the locked safe.

In any event, even if the transmitter ID serves its intended purpose for wide-angle indoor wireless LANs, it is unnecessary for outdoor point-to-point systems, and imposes costs far in

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[7] Oxygen absorption further reduces this to 2 pW/cm².

[8] The Commission notes a "low probability of co-channel interference" due to oxygen absorption and pronounced rain fade, Notice at ¶ 17 n.55, and acknowledges that the low power incident to unlicensed use further reduces the chance of interference. *Id.* at ¶ 17.

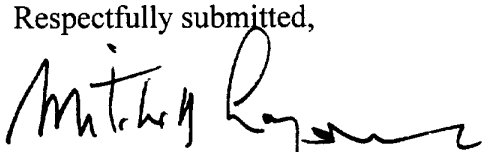
[9] 47 C.F.R. § 15.255(i).

excess of any benefits. The rules should mandate transmitter ID only for indoor systems and for systems using half-power beamwidths greater than 10 degrees.

CONCLUSION

The Commission should adopt its proposal to allocate 57-59 and 64-66 GHz for unlicensed operation, so that manufacturers can better meet users' demands for higher speeds and for transmissions subject to less impairment from oxygen absorption. The Commission should extend the technical rules for 59-64 GHz into these bands. However, inasmuch as the probability of interference from outdoor point-to-point systems is inherently extremely low, the Commission should abolish the transmitter identification requirement for these systems.

Respectfully submitted,



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September 21, 1999

Counsel for Harmonix Corporation

CERTIFICATE OF SERVICE

I, Delphine I. Davis, a secretary for the law firm of Fletcher, Heald & Hildreth, P.L.C., hereby certify that a true copy of the foregoing "Comments of Harmonix Corporation" was sent this 21st day of September, 1999, first class mail, postage prepaid, to the following:

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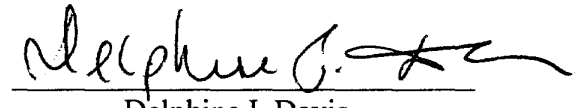

Delphine I. Davis

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